IntesisBox® Modbus Server

Galaxy RS232

User's Manual

V10 r10 eng

Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

© Intesis Software S.L. 2009. All Rights Reserved.

Information in this document is subject to change without notice. The software described in this document is furnished under a license agreement or nondisclosure agreement. The software may be used only in accordance with the terms of those agreements. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or any means electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of Intesis Software S.L.

Intesis Software S.L.
Milà i Fontanals, 1 bis - 1º
08700 Igualada
Spain

TRADEMARKS
All trademarks and tradenames used in this document are acknowledged to be the copyright of their respective holders.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

Gateway for the integration of Honeywell Galaxy intrusion detection systems into Modbus enabled control systems.

Order code:

IBOX-MBS-GALAXY

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

INDEX

1 Description 5
1.1 Introduction 5
1.2 Functionality 6
2. Modbus interface of IntesisBox 7
2.1 Description 7
2.2 Modbus register map 7
2.3 Functions supported 8
3. LinkBoxMB. Configuration & monitoring tool for IntesisBox Modbus Server series 9
3.1 Introduction 9
3.2 Project definition 10
3.3 Connections configuration 14
3.4 Datapoints configuration 17
3.5 Sending the configuration to IntesisBox 18
3.6 Signals viewer 19
3.7 System commands 20
3.8 Files 21
4. Set-up process and troubleshooting 22
4.1 Pre-requisites 22
4.2 Galaxy station configuration 22
4.3 Set-up procedure 23
5. Connections 26
6. Mechanical & Electrical characteristics 28
7. Functional characteristics 29
8. Dimensions 31

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

1 Description

1.1 Introduction

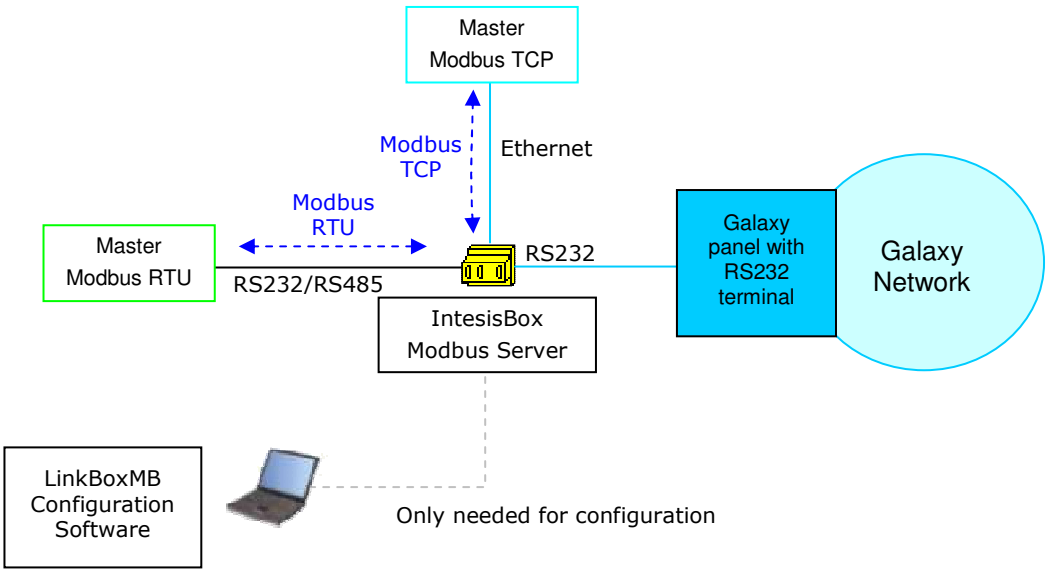
This manual addresses the integration of Honeywell (formerly Ademco Microtech) Galaxy intrusion detection systems into a Modbus master device or system, using *IntesisBox Modbus Server – Galaxy RS232* gateway.

The aim of this integration is to make available signals and resources of Galaxy panels equipped with RS232 interface to a Modbus master device or system. From the Modbus system point of view *IntesisBox Modbus Server - Galaxy* acts as a slave device, responding to data polls coming from the Modbus master. From the Galaxy system point of view acts as a third party communication device monitoring/controlling a Honeywell Galaxy alarm panel (by periodically polling it), and serving the retrieved data to the Modbus side.

Both the Galaxy Classic and 3 Series ranges are supported by IntesisBox. Galaxy 3 Series panels with a model reference ending with 'C' support an on-board RS232 port. E.g. models 3-48C, 3-144C, etc. All other 3 Series panels and the Galaxy Classic range require an optional RS232 module to be fitted to line 1.

Supported Range

- Galaxy Classic Panel – 8/18/60/500/512 zone panel.
- Galaxy Series 3 Panel with onboard RS232 – 3-48C, 3-144C, 3-520C.
- Galaxy Series 3 Panel with external RS232 module – 3-144, 3-520.



Integration of Honeywell Galaxy using Intesis Modbus Server

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

1.2 Functionality

IntesisBox retrieves Galaxy station status information by means of periodically polling it, using the so-called SIA standard serial protocol.

Once obtained, the information about the elements on the Galaxy system is mapped within a Modbus fixed-size predefined map of registers. This way, the procedure of configuration for this integration is comparatively simple, since there is no need to choose which element is mapped to which Modbus register – all possible elements to be monitored are already available on a Modbus fixed-size map whose addresses range from 1 to 2200.

Three types of Galaxy system elements can be monitored and controlled using IntesisBox:

- **Groups** (of zones) from 1 to 32[1].
  - Possible states of groups are:
    - Unset.
    - Set.
    - Partially set.
  - Possible operations on groups are:
    - Unset.
    - Set.
    - Partially set.
    - System Reset.
    - Abort set.
    - Force set.
- **Zones** from 1 to 512[1]
  - Possible states of zones are:
    - Tamper shortcircuit.
    - Low resistance.
    - Closed.
    - High resistance.
    - Open.
    - Open circuit.
    - No-alarm/Alarm condition.
    - Non-omitted/omitted condition.
  - Possible operations on zones are:
    - Change their Non-omitted/omitted condition (typically before system set/reset).
- **Outputs** from 1 to 256[1]
  - Possible states of outputs are:
    - On/Off.
  - Possible operations on outputs are:
    - Setting them On/Off.

IntesisBox can be configured as Modbus TCP slave or Modbus RTU (RS232/RS485) slave, within the software tool LinkBoxMB.

[1] Number of supported groups, zones and outputs will vary depending on the model of the installed Galaxy station

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

2. Modbus interface of IntesisBox

2.1 Description

IntesisBox implements a Modbus slave interface, accessible either at RS232, RS485 or TCP ports (to be determined at configuration time along with its possible communication parameters – see section 3).

Fixed-size register map and implemented functions are described in the subsections below.

2.2 Modbus register map

Address range	**Range name**	**Address** (PLC fashion – starting at addr 1)	**Physical address range** (as sent in bus – starting at addr 0)	**Description and values**	**Read /Write**
1 to 10	Galaxy Link Status	1	0	Wrong passcode ▪ 0: System OK ▪ 1: Wrong passcode for remote access	R
		2	1	Communication error ▪ 0: System OK ▪ 1: Comm error with Galaxy station	R
		3 to 10	2 to 9	Not used – always 0	R
11 to 42 (10 + group number)	Group Status	11 to 42	32 to 41	Status of groups 1..32: ▪ 0: Unset ▪ 1: Set ▪ 2: Partially set ▪ 3: System Reset * ▪ 4: Abort set * ▪ 5: Force set * * These are control commands only (meant only to be written)	R/W
43 to 50	Not Defined			Not used – always 0	R
51 to 82 (50 + group number)	Group Alarm Status	51 to 82	50 to 81	Alarm status of groups 1..32: ▪ 0: Normal ▪ 1: Alarm ▪ 2: Reset Required	R
83 to 100	Not Defined			Not used – always 0	R
101 to 612 (100 + zone number)	Zone State	101 to 612	100 to 611	Status of zones 1..512: ▪ 0: Tamper S/C ▪ 1: Low resistance ▪ 2: Closed ▪ 3: High resistance ▪ 4: Open ▪ 5: Tamper O/C	R
613 to 700	Not Defined			Not used – always 0	R
701 to 1212 (700 + zone number)	Zone Alarm State	701 to 1212	700 to 1211	Alarm status of zones 1..512: ▪ 0: Normal ▪ 1: Alarm	R
1213 to 1300	Not Defined			Not used – always 0	R

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

Address range	Range name	Address (PLC fashion – starting at addr 1)	Physical address range (as sent in bus – starting at addr 0)	Description and values	Read /Write
1301 to 1812 (1300 + zone number)	Zone Omit Status	1301 to 1812	1300 to 1811	Omit status of zones 1..512: ▪ 0: Normal* ▪ 1: Omitted* *Values can be both read or written	R/W
1813 to 1900	Not Defined			Not used – always 0	R
1901 to 2156	Output Status	1901 to 2156	1900 to 2155	Status of outputs 1..512: ▪ 0: Off* ▪ 1: On* *Values can be both read or written	R/W

As per Galaxy station behaviour, following is important to be taken into account:

- When an alarm condition is detected in a zone (indicated by IntesisBox's Modbus registers 701 to 1212 getting value '1') – and consequently also in its respective group (regs 51 to 82)– it can be acknowledged either locally on Galaxy station's panel (by entering suitable passcode) or else setting to value '3' (system reset) its respective group in IntesisBox's Modbus registers 11 to 42.
- Once acknowledged, the respective group will remain unset and the zone previously in alarm condition will remain in alarm condition (its corresponding Modbus register in IntesisBox in addr 701 to 1212 will remain '1') until the corresponding group is armed over again (setting a '1' in the corresponding Modbus register 11 to 42).

This may force to introduce additional logic to SCADA/BMS systems supervising the system. That's why, as explained in section 3, the so-called "auto-arm" feature has been implemented and can be enabled or disabled at configuration time:

- When "autoarm" feature of IntesisBox is used, IntesisBox will automatically arm a group under following situation whenever a group alarm condition is cancelled (by Galaxy system).

2.3 Functions supported

Modbus functions 03 and 04 (*read holding registers* and *read input registers*) can be used to read Modbus registers.

Modbus function 06 (*write single holding register*) must be used to write Modbus registers.

If *poll records* are used to read more than one register, it is necessary that the range of addresses requested contains valid addresses, if not the corresponding Modbus error code will be returned.

All the registers are of type integer (2 bytes) and its content is expressed in MSB..LSB.

Modbus error codes are fully supported, they will be sent whenever a non valid Modbus action or address is required.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3. LinkBoxMB. Configuration & monitoring tool for IntesisBox Modbus Server series

3.1 Introduction

LinkBoxMB is a Windows® compatible software developed specifically to monitor and configure IntesisBox Modbus Server series. It is possible to configure all external protocols available for IntesisBox Modbus Server and to maintain different customer's configurations based on a LinkBoxMB project for every different installation. It keeps on hard disk a copy of the last configuration files for every external protocol and customer, that is to say for every project.

From LinkBoxMB it is permitted to select the physical port to use to connect to IntesisBox, as well as configuring the integration signals list and connection parameters for every external protocol. It also poses as a tool for monitoring and debugging the IntesisBox. Some of these tools will be explained in this document, leaving the rest of available debugging tools and commands for exclusive use under the recommendation of Intesis Software technical support.

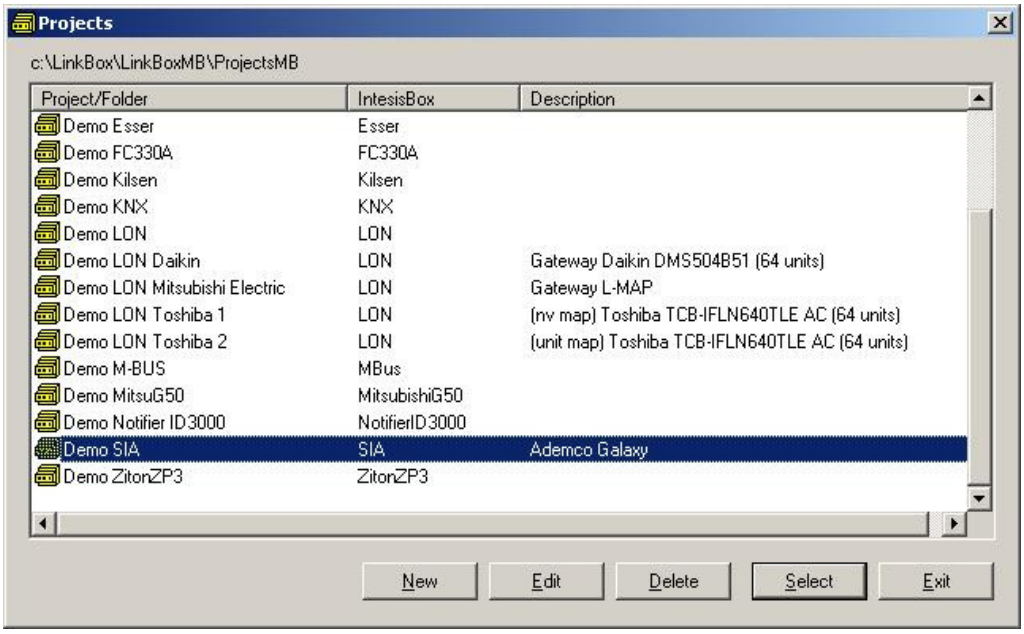
LinkBoxMB allows configuring all IntesisBox's Modbus Server series independently of the external system used. For every external system, LinkBoxMB has a specific configuration window. Periodically, new free versions of LinkBoxMB are released incorporating the latest developed integrations for external systems.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3.2 Project definition

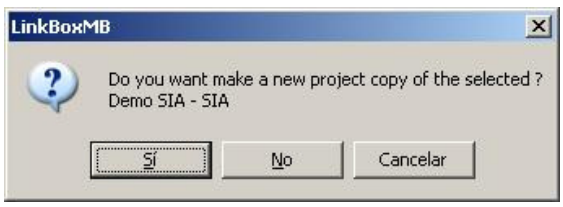
The first step to do in LinkBoxMB for a new installation is to create the installation's project giving a descriptive name to it. When you create a project, a new folder is created with the name of the project containing its configuration files, which depend on the external protocol selected for the project. It is strongly recommended that you create a new project for every installation – overwriting the configuration files for previous installations using the same external protocol will result, and consequently loosing the configuration data for those previous installations. The projects folder is located in AppFolder\ProjectsMB, where AppFolder is the installation folder of LinkBoxMB (by default C:\Program Files\Intesis\LinkBoxMB). Inside the projects folder, a new folder will be created for every project defined in LinkBoxMB with its related files.

When you open LinkBoxMB, the project selection window will appear prompting to select a project or to create a new one. A demo project for every supported external protocol is provided with the standard installation of LinkBoxMB. You can create a new project as a copy of the currently selected one.



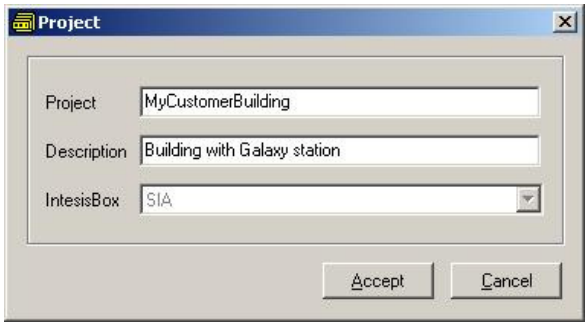
Project selection window

To create a new project, select a project using the same external protocol you want to use in the new project (*Demo SIA* in this case) and click on *New* button. You will be prompted to create a copy of the selected project (convenient for similar installations) or create a new one.



© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

If you select *Yes* you will be prompted to specify a name and a description for the new project that will be based on the same external protocol than the selected one. If you select *No* you can specify a name, a description and an external protocol to use from the list of available external protocols.



On *Accept*, a new folder will be created inside the projects folder with the name given to the project. This folder will contain a copy of the configuration files of the originally selected project – in case that it has been generated as a copy of an existing project. If the project has been created from scratch –i.e. not as a copy of an existing one– it will contain a regular template for the applying protocol, to be modified using LinkBoxMB.

A description of the files created for *Galaxy SIA*-protocol based project can be found in section *Files* in this document.

Changes in configuration for the integration can be performed while disconnected from IntesisBox (working off-line), allowing this task to be done more conveniently in the office instead of onsite.

Before any monitoring or downloading action to IntesisBox can be performed, the connection between IntesisBox and the PC running LinkBoxMB must be established (working on-line). To do so follow these steps:

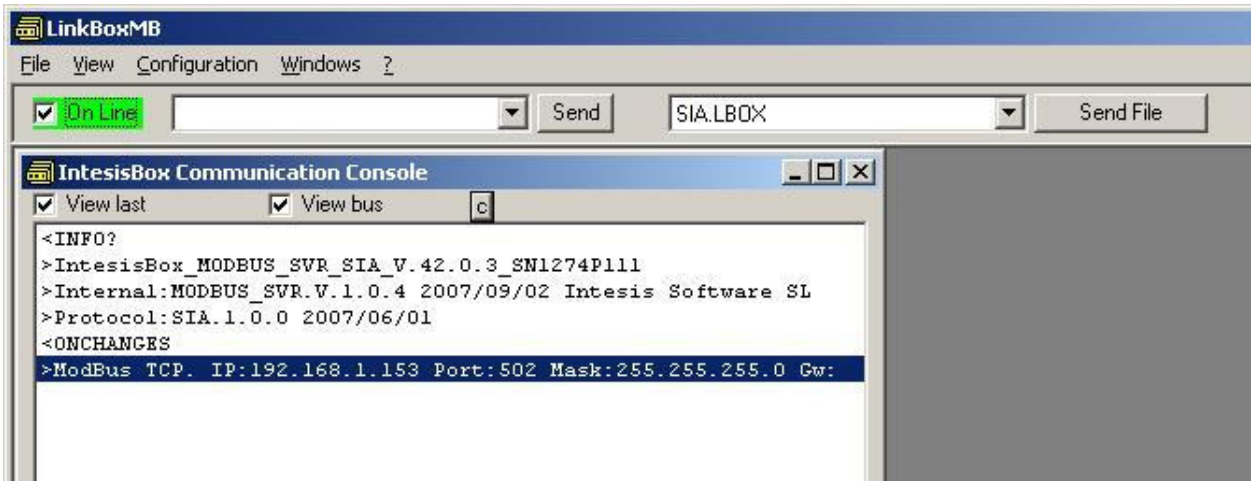
1. Make sure IntesisBox is powered-up a correctly connected to the Modbus system via the Ethernet connection (Modbus TCP) or serial connection (Modbus RTU) and to Galaxy station system via the RS232 connection (check details for connection and pin assignments in section *Connection*s of this document).

2. Connect a free PC serial port to the IntesisBox serial port marked as ***PC Console***. (Use the standard serial cable supplied with the device or a customer's cable following the pin assignments specified in section *Connections* in this document).

3. Select in LinkBoxMB the PC serial port used for the connection to IntesisBox. Use menu *Configuration -> Connection*.

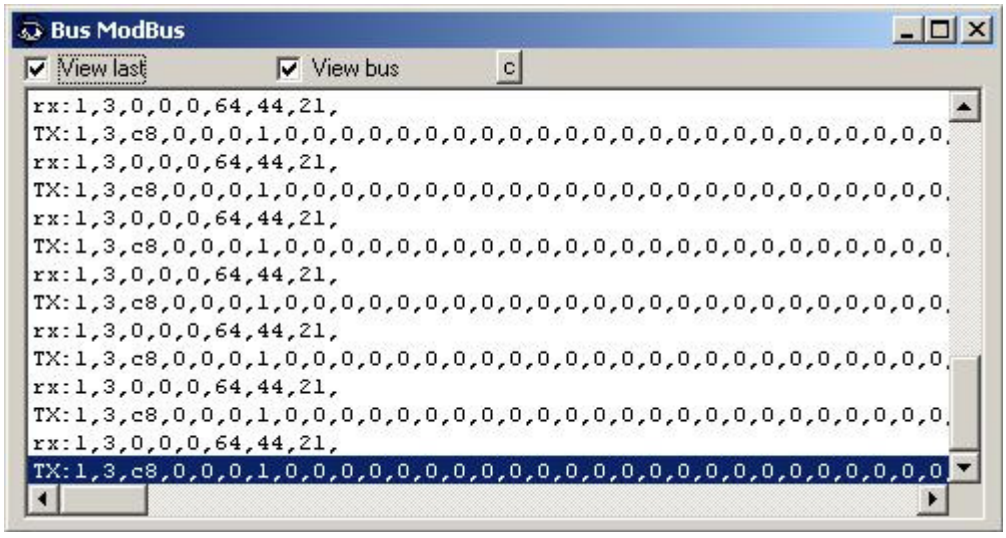
© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

4. Check the checkbox *off-line* under the menu bar (it will change automatically to *on-line*) and LinkBoxMB will ask for INFO about the IntesisBox connected to it via the serial connection, if the connection is ok then IntesisBox will respond with its identification (this can be monitored in the *IntesisBox Communication Console* window, as shown below).



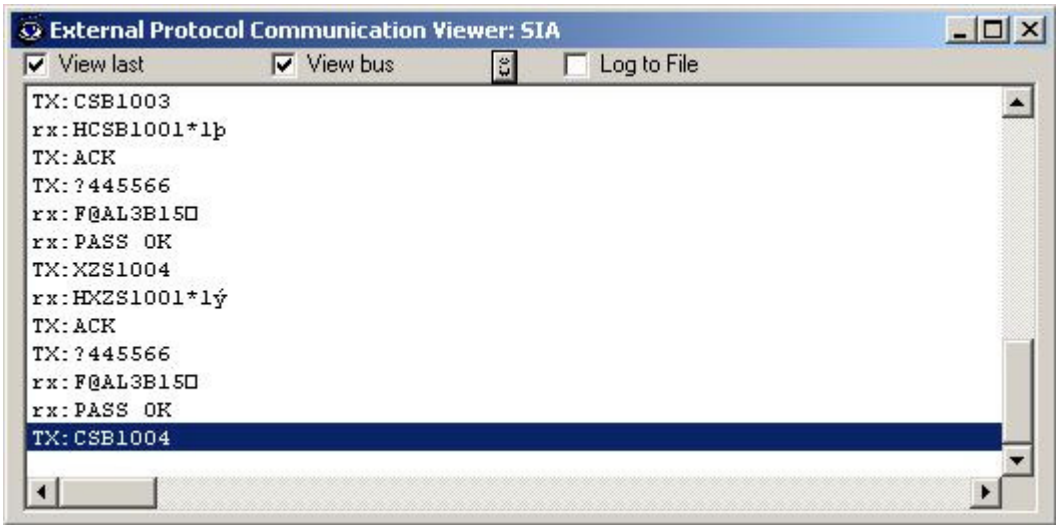
Once connected to IntesisBox, all the options of LinkBoxMB are fully operative.

To monitor the communication between IntesisBox and the Modbus master device, select the menu *View -> Bus -> Modbus*. The *Modbus communication Viewer* window will be opened. This window shows in real time all the communication frames between IntesisBox and the Modbus master device as well as debugging messages related to the internal protocol (Modbus) sent by IntesisBox.



To monitor the communication between IntesisBox and the external system (SIA – Galaxy in this case), select the menu *View -> Bus -> SIA*. The *External protocol communication viewer* window will be opened. This window shows in real time all the communication frames between IntesisBox and Galaxy station as well as debugging messages related to the external protocol (SIA – Galaxy) sent by IntesisBox.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134



© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

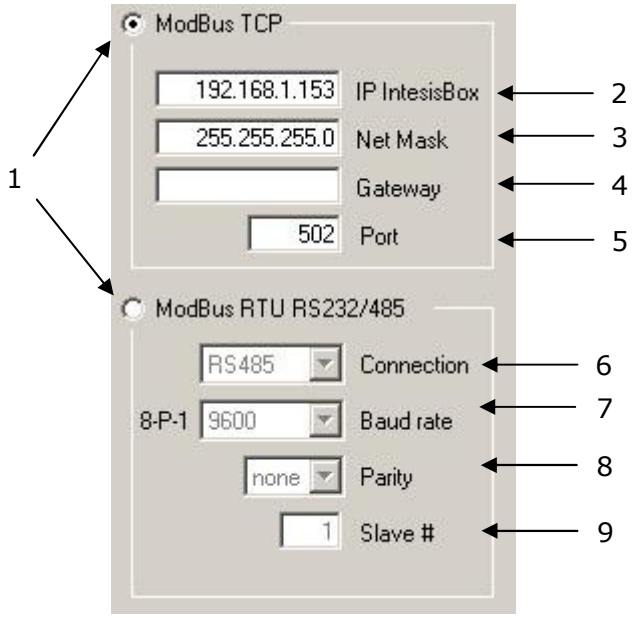
3.3 Connections configuration

To configure the IntesisBox's connection parameters and the signals list, select menu *Configuration -> IntesisBox*. The *SIA Configuration* window will be opened.

Select the Connection tab to configure the connection parameters.

Two kinds of information are configured using this window, the referent to the Modbus side and the referent to the SIA – Galaxy side.

Modbus side configuration parameters:



Modbus Interface Configuration

1. Select the type of connection desired (TCP or RTU).

If Modbus TCP is selected, then:

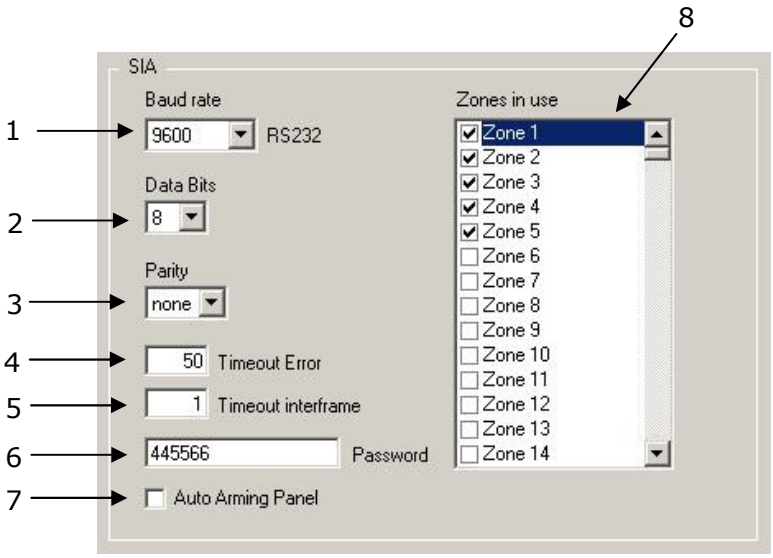
2. Enter the IP address for IntesisBox.
3. Enter the IP netmask for IntesisBox.
4. Enter the default router address to use by IntesisBox, leave blank if there is no need of router address.
5. Enter the TCP port to use, by default 502.

If Modbus RTU is selected, then:

6. Select the type of port to use (RS232 or RS485).
7. Select the baud rate to use.
8. Select the parity to use.
9. Enter the Modbus slave number for IntesisBox.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

SIA – Galaxy side configuration parameters:



SIA Galaxy Interface Configuration

1. Baud rate to use to communicate with Galaxy RS232 interface (default is 9600bps).
2. Data bits to use to communicate with Galaxy RS232 interface (default is 8 data bits).
3. Parity to use to communicate with Galaxy RS232 interface (default is N – no parity).
4. Frame timeout (in milliseconds) that IntesisBox will wait for a reply of Galaxy station after triggering a request. If this timeout is elapsed with no answer from Galaxy station, IntesisBox will retry (3 times). After 3 times without receiving an answer a communication error is signalled (default is 50ms)
5. Interframe timeout (poll period), in 10ms units for requests sent to SIA Galaxy station. This is the time that IntesisBox will wait between receiving an answer from SIA Galaxy and triggering the next request. Default is the minimum value, 1 (for 10ms), for the sake of achieving the maximum poll rate. Increase only if you have a reason to reduce load in Galaxy station's RS232 bus.
6. This is the Remote Access Passcode configured in the Galaxy station. See section 4.2 for details (default is 543210)
7. Activate or deactivate "auto arming panel" feature. Enabling this forces the station to automatically re-arm a group in case that an alarm has been acknowledged by user action.

    - Once an alarm has been acknowledged (either at Galaxy station's keypad or by means of IntesisBox), Galaxy station keeps signalling the corresponding zone as in alarm condition (and so is shown in IntesisBox modbus interface). In order to clear the alarm condition for this zone, it is needed to re-arm the station. Since this could impose the need to program some additional logic, enabling the "auto-arming" feature provided by IntesisBox automatically re-arms the station when an alarm is acknowledged (and thus clearing the alarm condition in the applying zone).
8. Activate zones for which following information is wanted:

    - Tamper status (short-circuit, open, low resistance, …)
    - Omit status (omitted or not)

    As per SIA Galaxy protocol specification, this information needs to be retrieved individually (one poll per zone). This results in delaying all other poll requests, and consequently drastically increasing the time needed for a complete poll cycle.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

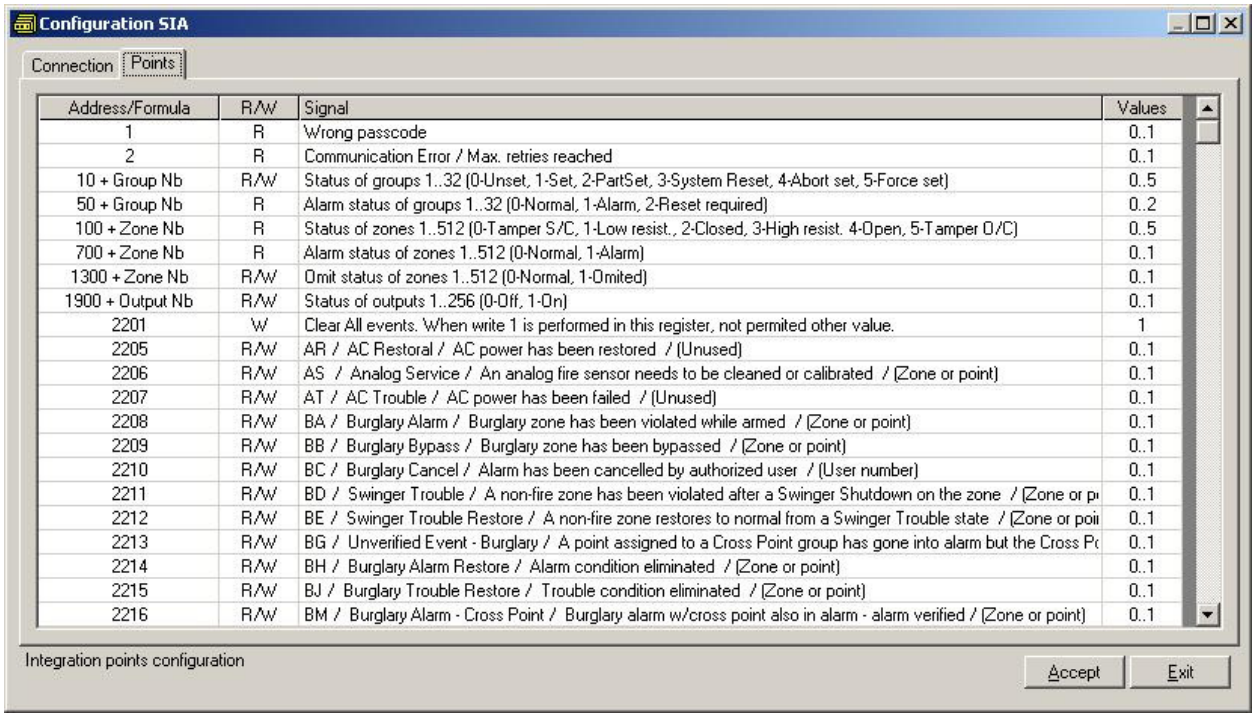
By default, all zones are disabled, achieving a higher poll speed – but then no information with regard to "tamper status" and "omit status" for zones is obtained. Alarm status for zones will be updated even though they are not enabled.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3.4 Datapoints configuration

By clicking the tab "Points" in IntesisBox configuration the map of registers as seen in the Modbus side is shown.

It is fixed in size and cannot be changed.



Address/Formula	R/W	Signal	Values
1	R	Wrong passcode	0..1
2	R	Communication Error / Max. retries reached	0..1
10 + Group Nb	R/W	Status of groups 1..32 (0-Unset, 1-Set, 2-PartSet, 3-System Reset, 4-Abort set, 5-Force set)	0..5
50 + Group Nb	R	Alarm status of groups 1..32 (0-Normal, 1-Alarm, 2-Reset required)	0..2
100 + Zone Nb	R	Status of zones 1..512 (0-Tamper S/C, 1-Low resist., 2-Closed, 3-High resist. 4-Open, 5-Tamper O/C)	0..5
700 + Zone Nb	R	Alarm status of zones 1..512 (0-Normal, 1-Alarm)	0..1
1300 + Zone Nb	R/W	Omit status of zones 1..512 (0-Normal, 1-Omited)	0..1
1900 + Output Nb	R/W	Status of outputs 1..256 (0-Off, 1-On)	0..1
2201	W	Clear All events. When write 1 is performed in this register, not permited other value.	1
2205	R/W	AR / AC Restoral / AC power has been restored / (Unused)	0..1
2206	R/W	AS / Analog Service / An analog fire sensor needs to be cleaned or calibrated / (Zone or point)	0..1
2207	R/W	AT / AC Trouble / AC power has been failed / (Unused)	0..1
2208	R/W	BA / Burglary Alarm / Burglary zone has been violated while armed / (Zone or point)	0..1
2209	R/W	BB / Burglary Bypass / Burglary zone has been bypassed / (Zone or point)	0..1
2210	R/W	BC / Burglary Cancel / Alarm has been cancelled by authorized user / (User number)	0..1
2211	R/W	BD / Swinger Trouble / A non-fire zone has been violated after a Swinger Shutdown on the zone / (Zone or p	0..1
2212	R/W	BE / Swinger Trouble Restore / A non-fire zone restores to normal from a Swinger Trouble state / (Zone or poi	0..1
2213	R/W	BG / Unverified Event - Burglary / A point assigned to a Cross Point group has gone into alarm but the Cross P	0..1
2214	R/W	BH / Burglary Alarm Restore / Alarm condition eliminated / (Zone or point)	0..1
2215	R/W	BJ / Burglary Trouble Restore / Trouble condition eliminated / (Zone or point)	0..1
2216	R/W	BM / Burglary Alarm - Cross Point / Burglary alarm w/cross point also in alarm - alarm verified / (Zone or point)	0..1

A detailed description of the Modbus register map is given in section 2.2 in this document.

Note that addresses from 2200 onwards are related to events received from Galaxy station. Each time an event is received, its corresponding register is set to "1". They can be cleared by writing a "1" in register 2201. Though, as explained throughout this document, most information obtained from Galaxy station is not based on events, but in polling the station.

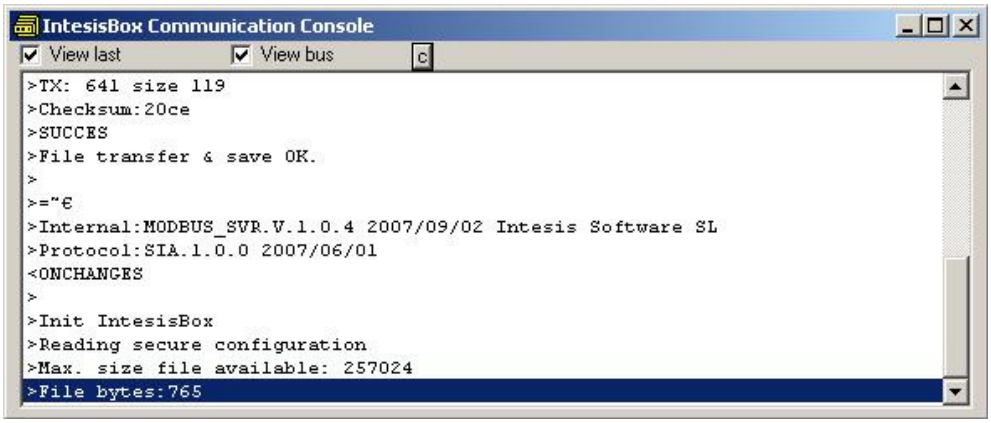
The feature for checking last received events is provided to enable obtaining any additional information not considered by the regular poll cycle that IntesisBox is periodically performing.

Take into account that you will need to enable those events you want to receive at Galaxy station's keypad (see section 4.2).

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3.5 Sending the configuration to IntesisBox

When the configuration has been saved (button *Accept*) and once IntesisBox's configuration binary file has been generated (remember to select yes when asked if you want to generate the IntesisBox file), send the configuration file to IntesisBox by clicking on the button ***Send File***. The process of file transmission can be monitored in the *IntesisBox Communication Console* window. If the file transmission is ok, IntesisBox will reboot automatically and load the new configuration.



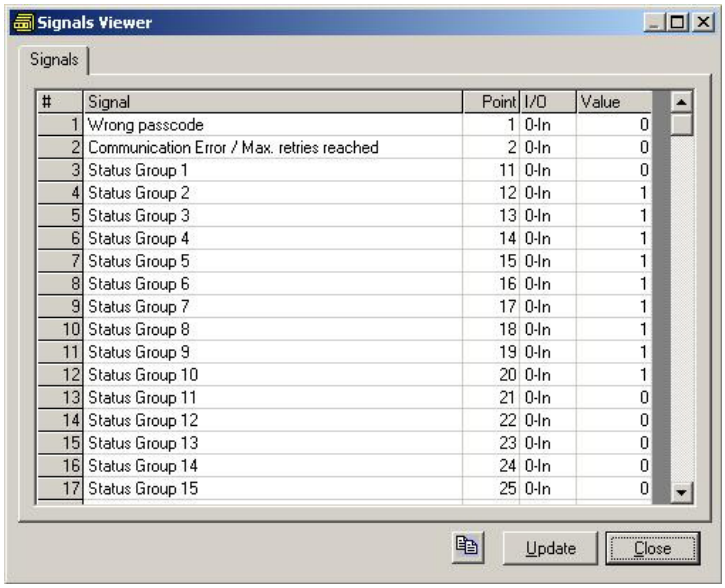
Remember that saving the configuration and generating the IntesisBox file only saves to the hard disk on the PC the configuration files. **Do not forget sending the configuration file to the IntesisBox by clicking button *Send File* after any change in the configuration.**

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3.6 Signals viewer

The signals viewer is a convenient interface for testing and monitoring the communication on both interfaces of the IntesisBox: *Galaxy RS232* and *Modbus*.

Open it when IntesisBox is running -with the correct configuration- by selecting menu *View -> Signals o*n LinkBoxMB. The signals viewer window shows then all IntesisBox's datapoints with its main configuration parameters and its actual value. After a reset of IntesisBox or after sending a configuration file to the IntesisBox, all datapoints values will be updated automatically in the signals viewer. In case that you connect to the IntesisBox when it is already running, you should press the *Update* button to get updated values - press the button once to update all the signal values: from this moment the signal values will be maintained updated until the connection is closed (online checkbox is clicked).



#	Signal	Point	I/O	Value
1	Wrong passcode	1	0-In	0
2	Communication Error / Max. retries reached	2	0-In	0
3	Status Group 1	11	0-In	0
4	Status Group 2	12	0-In	1
5	Status Group 3	13	0-In	1
6	Status Group 4	14	0-In	1
7	Status Group 5	15	0-In	1
8	Status Group 6	16	0-In	1
9	Status Group 7	17	0-In	1
10	Status Group 8	18	0-In	1
11	Status Group 9	19	0-In	1
12	Status Group 10	20	0-In	1
13	Status Group 11	21	0-In	0
14	Status Group 12	22	0-In	0
15	Status Group 13	23	0-In	0
16	Status Group 14	24	0-In	0
17	Status Group 15	25	0-In	0

It is possible to force a specific value to any signal for test purposes. To do so just double click on the row, enter the desired value and Accept in the Data Test window. The new value entered will be available through the *Modbus* interface, the same way as if it has been received from the *Galaxy* system.

The signals viewer can be used even though only one system is connected to the IntesisBox, *Galaxy* or *Modbus.*

This way, proper communication of a Modbus master device polling the IntesisBox can be tested, without the need of having a Galaxy station connected and running.

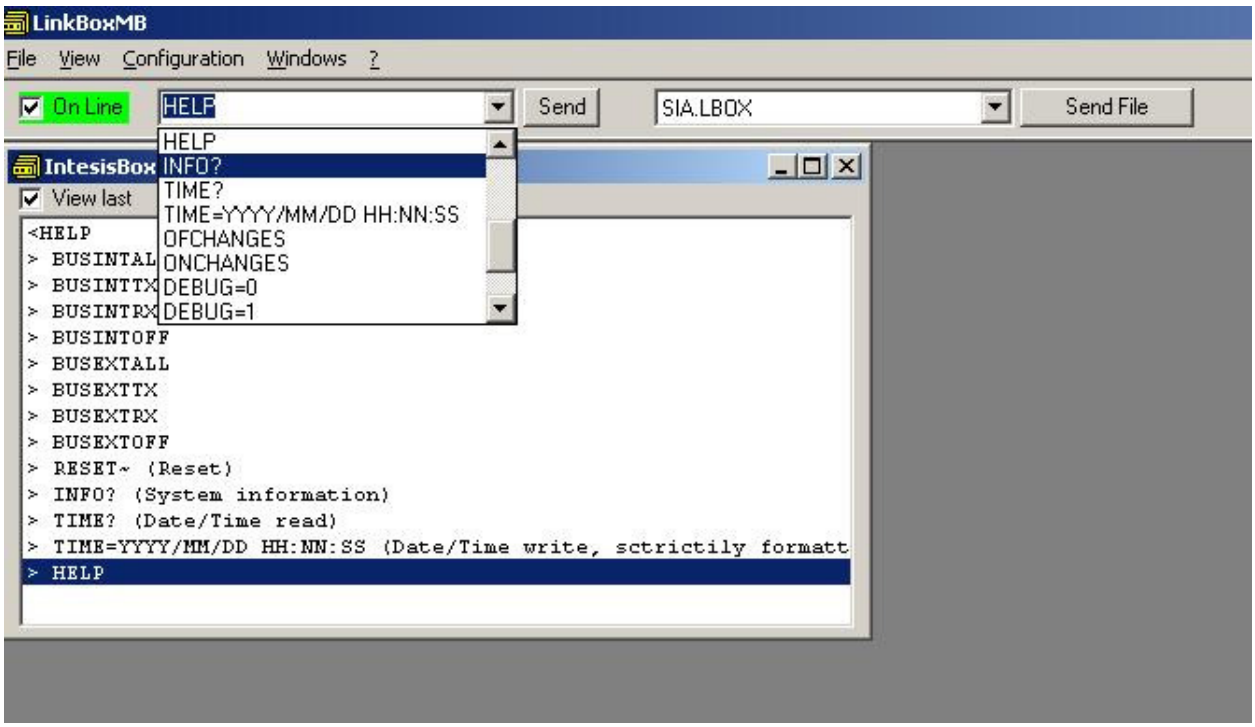
© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

Likewise, when a Galaxy station is connected, its behaviour can be tested and monitored from the signal viewer itself, without need of having a Modbus master attached to the IntesisBox.

The signals viewer window offers also a button to copy to the Windows Clipboard all the contents of the window (in CSV-like tab separated text format).

3.7 System commands

LinkBoxMB includes an option to send to IntesisBox a set of system commands for debugging and control purposes; this list is available in the commands list as shown in the figure below. To send a command to IntesisBox just select it from the list, or type it with the correct format, and press *Enter* or click on button *Send*. IntesisBox will act accordingly with the command received; the process can be monitored in the IntesisBox Communication Console window. The use of some of these commands can be critical for IntesisBox normal functioning, having this in mind use only these commands following the recommendations of Intesis Software technical support. A list of the more commonly used commands and the way to use them will be returned by IntesisBox after sending the HELP command.



© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

3.8 Files

LinkBoxMB saves the integration configuration in the following files inside the project folder:

PROJECT.INI	.ini file containing general information related to the project
SIA.INI	.ini file containing the configuration information, generated by the user when using LinkBoxMB
SIA.LBOX	Binary file created from the information in the two files described above. This is the file downloaded to the IntesisBox after configuration.

It is strongly recommended to back up the project folder containing these files in external media once the installation process is finished. This way you will be able to do future configuration changes in case of reinstallation of LinkBoxMB due, for example, to a failure of the hard disk in the PC where LinkBoxMB was installed.

The configuration cannot be uploaded from IntesisBox to LinkBoxMB, it can only be downloaded; Downloadable file SIA.LBOX does not contain all the integration information, as for example the signals description.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

4. Set-up process and troubleshooting

4.1 Pre-requisites

It is necessary to have the Modbus master device operative and well connected to the Modbus port of IntesisBox, remember to respect the maximum of 15 meters cable distance if using RS232 communication.

It is necessary to have the Galaxy panel with its RS232 interface operative and at a distance of IntesisBox installation site of 15 meters maximum (as per RS232 communication specification).

Galaxy 3 Series panels with a model reference ending with 'C' support an on-board RS232 port. E.g. models 3-48C, 3-144C, etc. All other 3 Series panels and the Galaxy Classic range require an optional RS232 module to be fitted to line 1.

Connectors, connection cables, PC for LinkBoxMB, and other auxiliary material, if needed, are not supplied by Intesis Software for this standard integration. The items supplied by Intesis Software for this integration are:

- Intesis Modbus Server device with Galaxy SIA external protocol firmware loaded.
- LinkBoxMB software to configure IntesisBox.
- Console cable needed to download the configuration to IntesisBox.
- Product documentation.

If requested, Intesis Software also can supply:

- Standard plug-in power supplies 220Vac 50Hz to power IntesisBox.

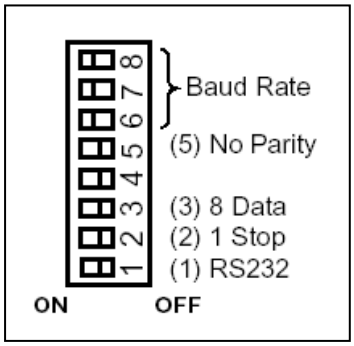
4.2 Galaxy station configuration

RS232 Interface Module

The Galaxy RS232 module, if used, should be installed on line 1 only.

Configure the 8-way DIP switch on it as follows (recommended):

Switch		Setting
1	Protocol: RS232	Off
2	Stop Bits: 1 *	Off
3	Data Bits: 8 *	Off
4	Parity: n/a	Off
5	Parity Enable: None *	Off
6	Baud Rate: 9600 *	On
7	Baud Rate	Off
8	Baud Rate	On



* Recommended values, in any case set in LinkBoxMB the baud rate, and the byte format format to match the one's configured here.

Check the RS232 module is configured from LED LD1. This will flash once per second (0.1 sec on, 0.9 sec off) to indicate normal communications between the module and panel.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

Refer to the Galaxy document IO1-0054 for more information.

RS232 port for those Galaxy stations having it onboard (instead of using a separate module) is configured by accessing the keypad in the panel (see next subsection).

Configuration of the Galaxy Station

Use the Galaxy keypad to configure the RS232 module.

- Enter Engineer code + ENT + engineer code + ENT. This will grant access for changing the configuration information. Default engineer code is 112233
- Using keys A, B, ENT (enter) and ESC (escape), navigate through the menu and go to option 56=Communications.
- Select option 2=RS232
- Set 1=Mode to Direct
- Set 2=Format to SIA (might appear as OEM). Select SIA level 4.
- It will ask then which events you want to enable to be triggered in the RS232 communication port. They can all be left to OFF, since IntesisBox periodically polls Galaxy station (instead of parsing events).
- Set 1=Account No. to any 4-6 digit number.
- In case of having onboard RS232 port also set [4] Comms Setup: Baud Rate 9600bps*; Data Bits 8*; Stop Bits 1*; Parity No parity*.
- Leave the menu using the esc key.

* Recommended values, in any case set in LinkBoxMB the baud rate, and the byte format to match the one's configured here.

Refer to the Galaxy Programming Manual for more information.

Access Codes

Make a note of the Remote Access code (*default 543210*). This is the last user number, e.g. User 250 on a 3-144 panel or user 999 on a 3-520 panel.

This password should be configured within the LinkBoxMB, the configuration software of IntesisBox, later.

4.3 Set-up procedure

1. Install LinkBoxMB on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.

2. Install IntesisBox in the desired installation site. The mounting can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground beside the Galaxy communication interface or Panel is recommended).

3. Connect the communication cable coming from the Modbus master device to the port marked as **Modbus** of IntesisBox (using either RS232, RS485 or Ethernet port depending on the desired type of Modbus communication). (See details for this communication cable in section *Connections* of this document).

4. Connect the communication cable coming from the RS232 port of the Galaxy station or communication module to the port marked as **Galaxy** of IntesisBox. (See details for this communication cable in section *Connections* of this document).

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

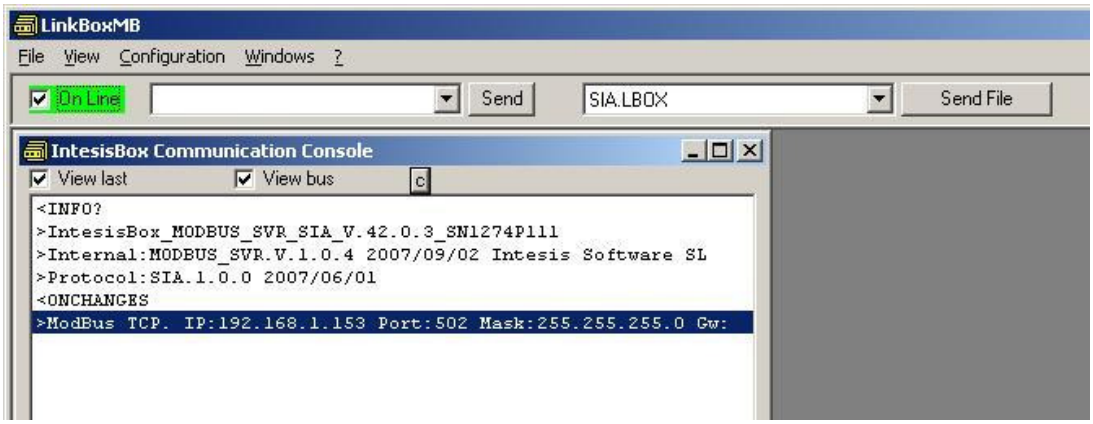
5. Power up IntesisBox. The supply voltage can be 9 to 30 Vdc or just 24 Vac. You can use also the standard plug-in power supply 220/125VAC-12VDC/300mA supplied with the device (if requested). Take care of the polarity of the supply voltage applied.

   WARNING! In order to avoid earth loops that can damage IntesisBox and/or any other equipment connected to it, we strongly recommend:

   - The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
   - The use of AC power supplies only if they are floating and not powering any other device.

6. Connect the communication cable coming from the serial port of your laptop PC to the port marked as **PC Console** of IntesisBox. (See details for this communication cable in section *Connections* of this document).

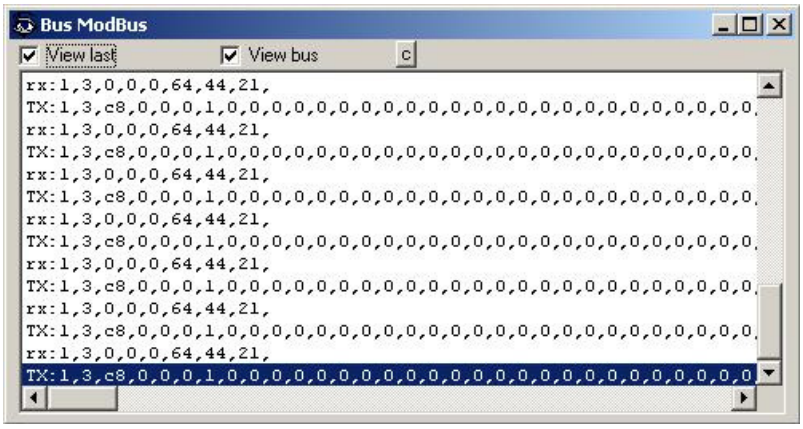
7. Open LinkBoxMB, create a new project selecting a copy of the one named **DEMO SIA Galaxy** and give it the name desired, select the serial port used to connect to IntesisBox (menu Configuration -> Connection) and switch working mode to *on-line* (checkbox *off-line/on-line*). The IntesisBox identification must appear in the *IntesisBox communication console* window as showed below.



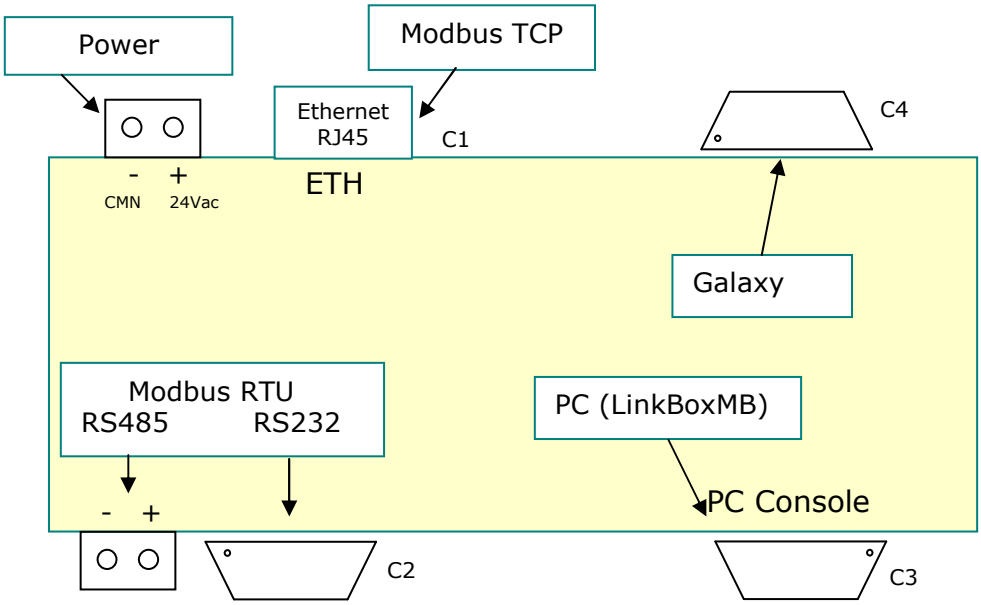
8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained before.

9. Open the *Modbus Communication Viewer* window (menu View -> Bus -> Modbus) and check that there is communication activity, some TX frames and some other rx frames. This means that the communication with the Modbus master device is ok. In case there is no communication activity between IntesisBox and the Modbus master device check that it is operative, check the baud rate, and check also the communication cable used to connect both devices. (See details for this communication cable in section *Connections* of this document).

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134


Bus ModBus
View last
View bus
c
rx:1,3,0,0,0,64,44,21,
TX:1,3,c8,0,0,0,1,0,0,0

5. Connections



Connect IntesisBox's Modbus Port to the control system

Using cable, connect the control system to the IntesisBox, either using Modbus TCP through the IntesisBox's ethernet port, or Modbus RTU through the IntesisBox's RS232 port or RS485 port. See details of the cable below.

IntesisBox (DB9 M)	C2	Modbus RTU Connection (RS232 using DB9 connector)		Modbus master RS232
Cable (DB9 F)				Cable
RX	2	←		TX
TX	3	→		RX
GND	5	↔		GND

IntesisBox (Terminal block 2p)	RS485	Modbus RTU Connection (RS485 using terminal block)		Modbus master RS485
Cable				Cable
TX/RX +	+	↔		TX/RX +
TX/RX -	-	↔		TX/RX -

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

IntesisBox (RJ45 H)	C1 Eth	Modbus TCP Connection		Master TCP (RJ45 H)
Cable (RJ45 M)		(using Ethernet)		Cable (RJ45 M)
		Cable UTP/FTP Cat5 Crossed		Direct to device
		Cable UTP/FTP Cat5 Straight	Hub	Through hub or switch

Connect IntesisBox's Serial Port to Galaxy System

Using cable, connect the Galaxy system to the IntesisBox's serial port marked as *Galaxy RS232*. See details of the cable below.

IntesisBox (DB9 M)	C4	Galaxy connection (Internal RS232, 4-way terminal block)		Galaxy 4-way terminal block
Cable (DB9 F)		RS-232		Cable
RX	2	←		TX
TX	3	→		RX
				CTS
				RTS
GND	5	↔		0V

IntesisBox (DB9 M)	C4	Galaxy connection (RS232 Module, DB25 male connector) RS-232		Galaxy (DB25 M)
Cable (DB9 F)				Cable (DB25 F)
RX	2	←	2	TX
TX	3	→	3	RX
GND	5	↔	7	GND

Connection of IntesisBox's Console Port to the PC COM port for configuration of IntesisBox using LinkBoxMB

IntesisBox (DB9 F)	C3	PC (LinkBoxMB) Connection		PC (DB9 M)
Cable (DB9 M)		RS-232 (Straight)		Cable (DB9 F)
TX	2	→	2	RX
RX	3	←	3	TX
GND	5	↔	5	GND

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

6. Mechanical & Electrical characteristics

Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 107mm x 105mm x 58mm.
Colour	Light Grey. RAL 7035.
Power	9 to 30Vdc +/-10% 1.4W. 24Vac +/-10% 1.4VA. Plug-in terminal bloc for power connection (2 poles).
Mounting	Surface. Wall. DIN rail EN60715 TH35.
Modbus TCP port	1 x Ethernet 10BT RJ45.
Modbus RTU ports	1 x RS232. DB9 male connector (DTE). 1 x RS485. Plug-in terminal bloc (2 poles).
Galaxy RS232 port	1 x RS232. DB9 male connector (DTE).
LED indicators	1 x Power. 2 x Galaxy RS232 port activity (Tx, Rx). 2 x Modbus RTU port activity (Tx, Rx). 2 x Ethernet port link and activity (LNK, ACT).
Console port	RS232. DB9 female connector (DCE).
Configuration	Via console port.[1]
Firmware	Allows upgrades via console port.
Operational temperature	-40°C to +70°C
Operational humidity	5% to 95%, non condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).

[1] Standard cable DB9male-DB9female 1,8 meters long is supplied with the device for connection to a PC COM port for configuring and monitoring the device. The configuration software, compatible with Windows® operating systems, is also supplied.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

7. Functional characteristics

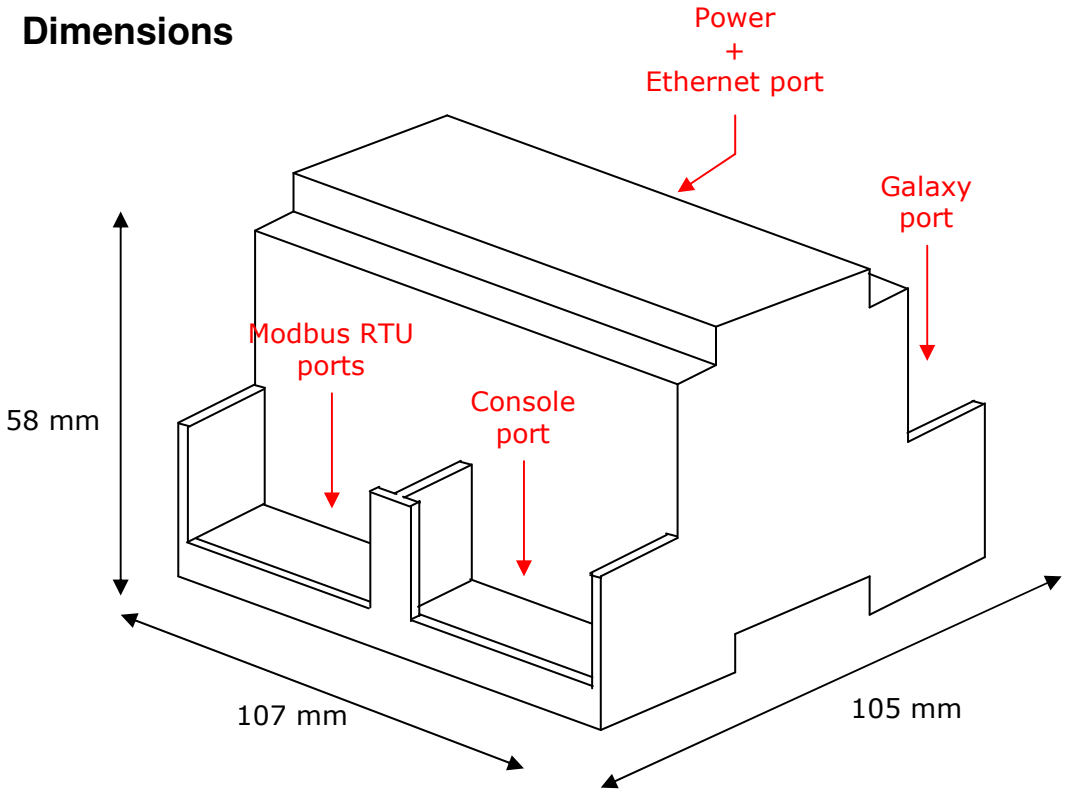
General	
Number of points	~2000
Virtual signals	Communication error with Galaxy system. Wrong passcode for Galaxy system. (both available from Modbus)
Galaxy RS232 interface	
Type	External system connected to onboard RS232 card (Galaxy 3 Series panels with model reference ending with 'C'), or separate RS232 module (Galaxy 3 series with model reference not ending with 'C' and Galaxy Classic range). It uses SIA alliance serial protocol.
Configuration parameters	• Baud rate. • Data bits. • Parity. • Timeout for communication error signal activation. • Poll period. • Enablement of "auto-arming" feature (re-arming a group once its alarm has been acknowledged). • Remote access passcode. • Zones to be polled.
Interactivity with Galaxy system	Read/Write allowed.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

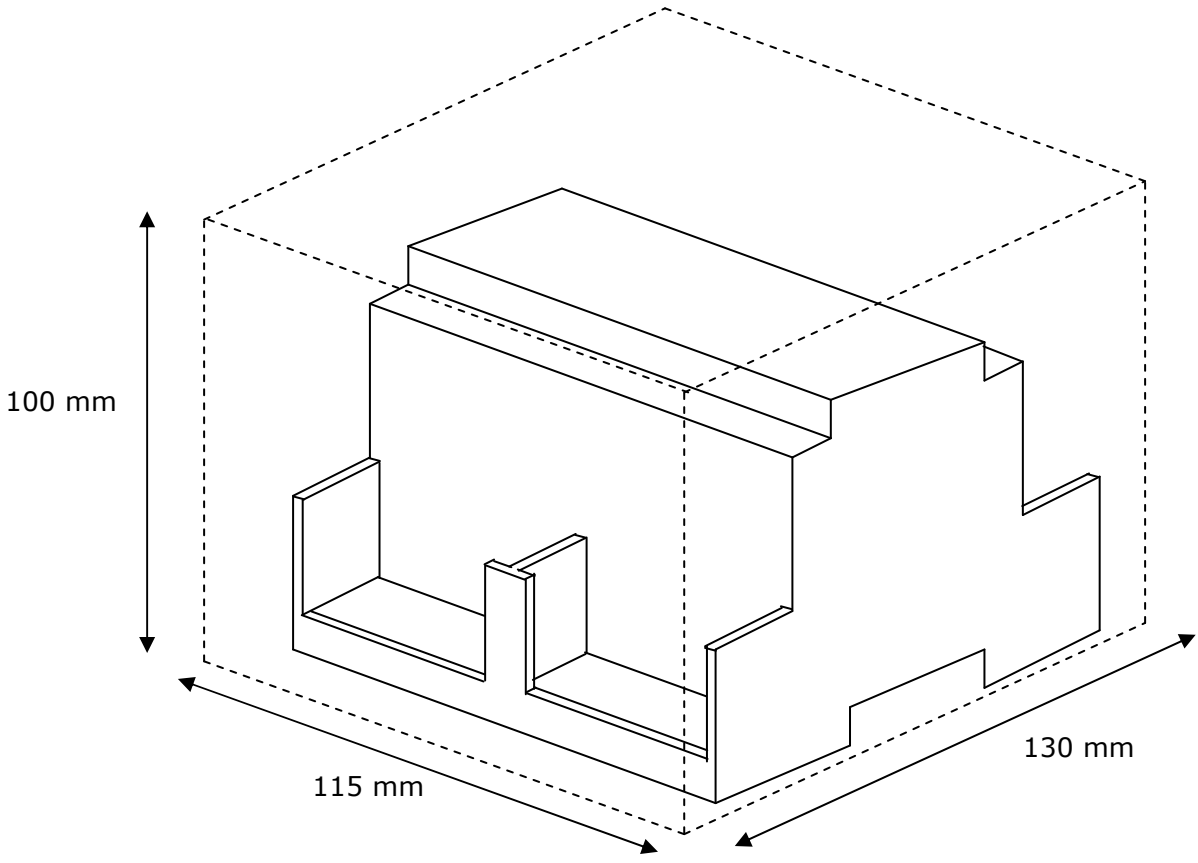
Modbus interface	
Device type	Slave.
Modbus modes supported	TCP, RTU RS232 or RS485.
Modbus TCP configuration parameters	• IP address. • Subnet mask. • Default gateway. • TCP port.
Modbus RTU configuration parameters	• RS232/RS485. • Baud rate. • Slave number.
Points	
Type of points	▪ **Groups** ○ Possible states of groups are: ▪ Unset. ▪ Set. ▪ Partially set. ○ Possible operations on groups are: ▪ Unset. ▪ Set. ▪ Partially set. ▪ System Reset. ▪ Abort set. ▪ Force set. ▪ **Zones** ○ Possible states of zones are: ▪ Tamper shortcircuit. ▪ Low resistance. ▪ Closed. ▪ High resistance. ▪ Open. ▪ Open circuit. ▪ No-alarm/Alarm condition. ▪ Non-omitted/omitted condition. ○ Possible operations on zones are: ▪ Change their Non-omitted/omitted condition (typically before system set/reset). ▪ **Outputs** ○ Possible states of outputs are: ▪ On/Off. ○ Possible operations on outputs are: ▪ Setting them On/Off.
Modbus data types	All the points are of data type UNSIGNED INT in the Modbus interface.

© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134

8. Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections



© Intesis Software S.L. - All rights reserved
IntesisBox *is a registered trademark of Intesis Software SL*
Intesis software
URL http://www.intesis.com
email info@intesis.com
tel +34 938047134